

and lower Miocene time and have reached their present height only recently. In England we find Cretaceous folding in places following the underlying Carboniferous folding, with peneplanation between. In the Appalachians, evidence is accumulating that folding began in Ordovician time or earlier, and it begins to look as though the eastern Appalachians had largely been folded by the beginning of Silurian time or continued to be folded during Post-Ordovician time and thus became the source area for the later Paleozoic rocks. Finding Devonian fossils in "Pre-Cambrian" schists in New England is only one of the disturbing new facts.

This is not the time or place to go into details. I only mention some of the new theories, to show how ideas on orogeny are struggling to emerge. These studies are revealing new patterns or a framework in the earth's major features. New facts are complicating old problems, but they also serve to define more clearly those problems, until, as C. F. Kittering would say, "Some day we will have defined our problems so exactly that we shall have solved them."

Without pursuing the matter further, we realize today that our urgent need in every geological field is for facts and more facts. Our knowledge of the earth is just about where the knowledge of the body was two or three hundred years ago. Unfortunately our efforts to penetrate the mysteries of the earth's interior are comparable to attempting to make an autopsy of a man's body with his clothes on.

PALEONTOLOGY.—*A specimen of "Crassatellites" from the St. Marys formation of Maryland.*¹ W. C. MANSFIELD.

Dr. S. F. Blake, U. S. Department of Agriculture, recently collected a left valve of the genus "*Crassatellites*" from the St. Marys formation at Chancellor Point, St. Marys River, Maryland, and kindly turned it over to me for identification. The bluish sandy clay deposit at Chancellor Point was referred by Shattuck² to zone 24, or the highest zone, of the St. Marys formation of Maryland.

The specimen in hand is interesting because no species or subspecies of "*Crassatellites*," to my knowledge, has heretofore been identified from the St. Marys formation of Maryland, although two subspecies—"C." *meridionalis surryensis* Mansfield and "C." *undulatus urban-*

¹ Published by permission of the Director, U. S. Geological Survey. Received December 24, 1936.

² SHATTUCK, G. B., Maryland Geol. Survey, Miocene, p. lxxxv, 1904.

naënsis Mansfield (formerly called a subspecies of *meridionalis*), have been obtained from the St. Marys formation of Virginia, the former taken from the basal bed consisting of a blue sandy clay exposed in the right bank of the James River, 1½ miles below Claremont Wharf; and the latter from a stratigraphically higher sandy deposit at Urbanna.³ The Maryland specimen, though slightly corroded in the umbonal region, appears either to be "*C.*" *meridionalis surryensis* Mansfield or a closely related form. The slight differences observed between the Maryland form and the Virginia subspecies is that the Maryland form is smaller, thinner, more quadrate, and the nepionic undulations extend radially about 3 mm farther. The dimensions of the Maryland specimen are: length, 70 mm; height, 50 mm; distance of umbo to the anterior end, 30 mm.

With only one specimen in hand from the St. Marys formation at Chancellor Point, I do not think a new subspecific name is warranted unless more specimens are collected from this horizon that show the assumed differences to be constant.

A right valve of a "*Crassatellites*," so far unidentified, was taken a number of years ago from a well at a depth of 130 feet at Crisfield, Sommerset County, Maryland. This specimen is corroded in the umbonal region; however, relying on the other better preserved parts of the shell, it appears to be the same as the subspecies from Virginia—"*C.*" *meridionalis surryensis*. The base of the St. Marys formation in this well is estimated to be at a depth of about 240 feet.

At present the following species or subspecies of "*Crassatellites*" are represented at different horizons of the Chesapeake group: "*C.*" *melinus* (Conrad), Calvert formation; "*C.*" *turgidulus* (Conrad), Choptank formation, zone 17; "*C.*" *marylandicus* (Conrad), Choptank formation, zone 19; "*C.*" *meridionalis surryensis* Mansfield, St. Marys formation, Maryland (?) and Virginia; "*C.*" *undulatus urbanaënsis* Mansfield, uppermost St. Marys formation, Virginia; "*C.*" *undulatus cyclopteras* Dall, Yorktown formation, zone 1 and later; "*C.*" *undulatus* (Say), Yorktown formation, zone 1, to Duplin marl (uppermost Miocene).

The name "*Crassatellites*" is placed in quotation marks here as the nature of this name has been indicated by Iredale (Mal. Soc. London Proc., vol. 14, p. 206, 1921) to be unsatisfactory. Consequently, the correct generic names to be applied to the east coast Miocene forms cannot be given until a study of the family Crassatellidae is made.

³ MANSFIELD, W. C., U. S. Nat. Mus. Proc., vol. 74, art. 14, pp. 8-9, 1929.